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ABSTRACT

One of the principal challenges in public administration is adapting to needs derived from the application of new technologies that impact directly on managing as well as transmitting information and in supplying it accurately to the citizens. The Bangemann Report calls attention to the important role played in the development of the information society by public administrations who should dedicate serious efforts and resources to the innovation and development of information as an added value with democratizing effects in society. The current situation of the European public administration information systems on the Internet is analyzed through a statistical bibliographic study measuring the following parameters: producers; subject coverage; services; whether of added value or not; the legal framework; electronic publications; use of the classic documentation tools to structure information; use of GIS; database management; date of creation; update frequency; implmentation of helps to locate information; confidentiality/privacy of the information; cost and quality control. From the analysis of the European public administration information systems on the Internet, different conclusions are obtained that allow for a more standardized design with improvements in the quality of the information and a better cost control. Analysis is performed on the use of systems which, based on those already existing and used in public administrations, permit the publication of this information on the Internet. It appears that public administration should increase the use of new information systems such as the Internet. This will result in greater efficiency in the development of its functions and, therefore in better service to the citizens. (Contains 21 references.) (Author)

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European Public Administration Information Systems on the Internet

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Abstract: *One of the principal challenges in public administration is adapting to needs derived from the application of new technologies that impact directly on managing as well as transmitting information and in supplying it accurately to the citizens. The Bangemann Report calls attention to the important role played in the development of the information society by public administrations who should dedicate serious efforts and resources to the innovation and development of information as an added value with democratising effects in society.*

The current situation of European public administration information systems on the Internet is analysed through a statistical bibliographic study measuring the following parameters: producers; subject coverage; services, whether of added value or not; the legal framework; electronic publications; use of the classic documentation tools to structure information; use of GIS; database management; date of creation; update frequency; implementation of helps to locate information; confidentiality/privacy of the information; cost and quality control.

From the analysis carried out of European public administration information systems on the Internet, different conclusions are obtained that allow us to perform a more standardised design with improvements in the quality of the information and a better cost control. Analysis is performed of the use of systems which, based on those already existing and used in public administrations, permit the publication of this information on the Internet.

It seems to us that public administration should increase the use of new information systems such as the Internet. This will result in greater efficiency in the development of its functions and, therefore, in better service to the citizens, a service which constitutes the raison d'être of information systems for public service.

1. Introduction

Our present day society is the information society, where intelligence and knowledge are the resources of the future. This information society is built on telecommunication networks able to transmit great quantities of digital information. In June 1994 the Council of Ministers of the European Union, at the meeting in Corfu, considered the report of the High Level Group about Europe and the Global Information Society, known as the Bangemann Report, which calls attention to the importance of public administrations in the development of the information society.

One of the principal challenges facing public administration is to adapt to the new necessities derived from the application of new information technologies which directly involve managing as well as transmitting information, which must be supplied accurately to the citizens who ever more often ask for clear and concrete answers to their queries. These answers are not possible if we do not have true, updated and easily accessible information.

The relationships between administration and the administered are becoming those of server and client. Thus the Web servers of public entities and administrations are converted into authentic windows opening into cyberspace from which the public are supplied with information as to the services offered, or are even provided directly with those services, eliminating physical, spatial and temporary barriers in a way that would have been unimaginable only a few years ago.

The European Union has strongly supported the development of the field of telematics with programmes such as IMPACT, which ended in December 1995, and the INFO2000 programme currently operating.

It is clear that public administrations cannot be excluded from this process and in fact they have not been, as

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can be seen in the high number of servers with all sorts of information that have been generated.

The motivation for this inclusion of information in the Net comes from different objectives:

- *to provide* access to the important information resources available, statistical as well as bibliographic and documentary;
- *to give information* about the departmental and organisational structure of central, autonomous and local administration;
- *to divulge information* about the programmes and initiatives that the different administrations may establish or bring together;
- *to facilitate* communication with the citizens as well as with other public organisations, with a view to greater administrative simplification.

One of the ways that public administration can improve service to the public is to provide the information. An information system on the Internet permits public administration:

- *to eliminate physical distance between the seeker of information and its source*, that information being accessible through any personal computer anywhere;
- *to facilitate all types of external information to the administration*, instantly and without needing to telephone or write to other national or international centres;
- to offer the user the *availability of information* 24 hours a day.

2. Directory of European public administration information systems on the Web

By European public administration we mean:

(a) the general administration of each state;

(b) the administrations of the autonomous communities;

(c) the institutions that form the local administration.

The construction of a directory of European public administration information systems on the Web is in an initial phase of development. Its principal purpose is to make known the existing resources in this matter, to promote their use and to analyse the problems found by administrations in putting their information on the Net. In spite of being in the development stage, we have reached the conclusion that these are today very heterogeneous.

To collect the data that compose this directory, the Lotus Notes database management system was used. The information collected for each information system permits the description of their most important characteristics: producers; subject coverage; services, whether they are added value or not; legal framework; electronic publications; utilisation of the classic documentation tools to structure the information; utilisation of GIS; database management; date of creation; updating frequency; implementation of support to locate information; confidentiality/privacy of the information; and cost/quality control.

One of the tools we used for the statistical bibliography study of European public administration information systems on the Web is a NETCARTA spider called CYBERPILOT (TM) PRO. Before the use of the spider the addresses of the Web sites were located using different search robots: Alta Vista, InfoSeek, Lycos, Ole, Ozu, Webcrawler, Yahoo and so on. The addresses provided must then be analysed and information is obtained from each Web site that allows us to conduct the study.

We are aware that that there are mistakes or omissions in spite of the efforts made to complete the information: we expect them to be corrected during the development of the project.

3. Current situation of European public administration information systems on the Web

The problems facing public administrations are on the one hand the safety, confidentiality and privacy of the information and, on the other, the shortage of both hardware and software infrastructures which is the reality in public administrations and which makes it difficult for them to export information to the Net.

The development of applications by public administration has been based on powerful database environments that permit the management of large quantities of information but which are today very complicated to export to the Web. Rewriting the information to produce HTML (hypertext markup language) pages is too tedious a task to be considered and, furthermore, all the functions which a search motor offers are lost.

Moreover, it is the intention of public administrations to use Internet applications within their own Nets to create an intranet that permits them to distribute information internally at a cost which is not excessively high.

Below some solutions are described which have been adopted by public administration to create a Web site on the Internet, and other more recent ones that we believe can be recommended and that will be used in the near future. The trend on the part of the suppliers of databases was to deliver a series of CGIs (Common Gateway

Interfaces) that permit the construction of a gateway between the relational database and the Web server. These CGIs can be classified in two categories: the developer of the CGI inserts SQL statements in it to work with the databases; and some products possess CGI standards which, installed in the Web server, constitute the interface with the DBMS (database management system).

Among the databases that provide this sort of software we may mention Informix, Oracle and BRS.

At the same time, Sun Microsystems with its Java language is working toward a standard similar to Microsoft's ODBS to work with the databases. This supposes that an application written in Java will be able to exchange data with thousands of applications already existing, and it will be able to generate what has been called the data Web in which the browser is only a front-end between the database and the client. Currently we can develop an interface between the program written in Java and the API of the database, but Sun is developing the JDBC (Java database connectivity).

The JDBC is a middleware level that presents a standard API for access to the data (to open a connection, to launch a conference and so on) which will load the necessary driver for the specific database. Some suppliers of databases have already announced support of the JDBC protocol: Oracle, Gupta, Informix, IBM with DB/2, Object Design and Sybase.

They will provide Java extensions to their tools but the real step forward would be to propose tools completely developed in Java. In addition to this, a final phase would be to give to Java surfers the possibilities provided by transactional monitors, permitting evolved mechanisms of data validation, managing a considerable number of transactions and the possibility of access to distributed databases.

On another front we find some suppliers of databases such as Oracle and Lotus which, through their products Oracle Web Server and InterNotes Web Publisher, provide all the power of a database server integrated with a Web server.

Oracle Web Server is an integrated and complete environment with Oracle 7 as the engine of the central database. With this system applications can be created in PL/SQL (the procedural extension of SQL). The hypertext links contained in any HTML document can now directly run a stored procedure, allowing Oracle 7 to create dynamic HTML documents. The software packages that compose Oracle Web Server (Oracle Web Listener, Oracle Web Agent and Oracle 7) are totally configurable from an HTML interface. This solution of Oracle is totally compatible with HTML 2 and the improvements proposed by HTML 3.

As far as Lotus is concerned, it presents a solution to integrating intranet with Internet. Basically the solution has two parts: firstly there is Lotus Notes 4.0, database and groupware application that now includes a gateway with e-mail, SMTP and X400 as well as a database called InterNotes Web Navigator that permits the users of Notes to navigate the Web with their own Notes interface. This software also permits access restriction to certain Web sites, and to store and update the sites visited most frequently by our clients in order to be able to access the Internet with more agility.

Secondly, Lotus has a whole range of products known generically as InterNotes that permit the automatic publication of all our database Notes on the Internet. The basic operation of InterNotes is to create Web pages from a Notes database and to translate their documents to HTML, including the images that may be found within the documents. The update of these pages is performed automatically and periodically, at time lapses which may be as short as 30 seconds.

To carry out searches InterNotes uses the Notes server, thus being able to seek with all the complete text search functions offered by Notes. Access to the documents is through the views in the Notes database (indices ordered and categorised by entry fields to the documents) creating HTML documents of such views and updating each time the database is updated. Furthermore InterNotes Web Publisher provides Java and VRML support.

At the same time Lotus is working on new Web server software called Domino that will permit direct access to Notes servers and other database servers.

4. A guide to the use of the Internet in public administration

Public administrations now need to learn how to implement their initiatives on the Internet and how to distribute their information with security, and also need their documents to have a common basic format. It is for this reason that certain minimal procedures will have to be established which will be followed by all administrations:

(1) The Internet is a complex phenomenon that brings together different disciplines such as telecommunications, public relations, high technology, information management, security and so on. Its use by public administrations will mean incorporating these disciplines in the design of an information system if it is to be successful. Therefore its design will have to consider the creation of a multidisciplinary team with representatives from different departments: documentalists, telecommunications, the press and administration.

The Internet is only one of many mechanisms that a department can use to communicate with the citizen. Departments should consider setting up a process to identify and standardise the material being distributed on the Internet in the same way as they do with other publications.

(2) The costs of using the Internet include the time and resources needed to create and maintain information, the resources required to train personnel, telephone connection charges, and hardware and software costs. How can departments justify these costs? Is the Internet actually necessary today or should we work with it, waiting for it to be essential in the near future?. The implementation of the

Internet in all public administration departments requires high investment. To verify the costs and benefits of its use, a pilot experience can be carried out in one department which serves as a model to the others; limited access to e-mail or FTP could be offered to its users; or the number of users be limited. The departments would have to access the Internet through local nodes to avoid long-distance charges. The time and resources required to transform the documentation available in the Net into digital format should also be analysed.

(3) Equality of access must be guaranteed. Until access to the Internet is ubiquitous, public administration must still be made available in other formats for those who do not use or do not have access to the Internet. Information on the Internet exists in digital format, thus giving visually and hearing-impaired clients better access to information than many traditional formats and hence satisfying the right to information of all citizens.

(4) Integrity of the information transferred from the administration to the citizen. This can easily be changed and reposted to anyone else without the administration's knowledge or consent. Electronic information is easy to copy and modify. It is very difficult to avoid this and, therefore, it is important that those posting the information be aware of the time and date of the last update posted, and introduce a contact name and number so that users can verify the accuracy of information. This is particularly important for information relating to health and safety.

(5) Because of the nature of the Internet (a cooperative network with each node relying on the next for service) there is currently no service guarantee. Moreover, once a particular packet of information is in transit from a department to a user, we cannot predict the route it will take and the time it will take to arrive. Departments should determine the level of priority of service required and have alternatives in order to guarantee the result.

(6) Internet e-mail is not private. At the present time there is no foolproof way to authenticate the sender of a message or to be assured that an e-mail message was not intercepted and changed. Communications via e-mail should reflect the same tone and manner used in traditional correspondence. The e-mail policy of departments should indicate that classified and extremely sensitive information must not be transmitted via e-mail unless encrypted or protected properly.

(7) Personal information exists electronically within the public administration information systems connected to the Internet. From a security perspective, internal information systems containing personal information should be separated by a firewall (a specifically programmed machine that restricts access by controlling the interface between a subnetwork and Internet) or be located in a physically separate server that the public cannot access via the Internet.

(8) Users of public administration information on the Internet need to know that they can locate the information they want and that the information they locate is up to date, accurate and authentic. For this reason of identification, a similar presentation and format of all documentation in the Web is necessary. If departments provide a uniform description, consisting of a few basic elements, with each document on the Internet, users will be able to identify the relevant information in the documents rapidly and easily. For example, each Web page must include the title, creator, date, registration number, availability, access, publisher and URL, among other details.

(9) Public administration departments should consider security of information and departmental resources before connecting to the Internet. Security safeguards will differ depending on whether the department is providing internal access to the Internet, including e-mail, or external access by the public to departmental information, or both: the use of passwords, firewalls or gateways that isolate the departmental systems using computers which connect one network with another when the two networks use different protocols.

(10) The elements should include a Web page in the information system of the public administration in order to provide the Web surfer with correct identification:

- *Title*: this is the name that distinguishes the documents. It appears at the head of the document;
- *Creator*: identifies the author of the document. The name of the department, the administration and the country should be included. It can include the place where it is filed and the individual author's names and even the unit or service within the department;
- *Date*: in day/month/year format. It is the date on which the document was published. The last review date should be included so that users can determine if it has been modified;
- *Number of record*: ISBN, ISSN, URN if it is known;
- *Validity*: describes any legal limitation, if one exists, on the use or distribution of the document;
- *Access*: size of the document, existence of tables, images or sounds, hardware or software requirements to access the document;
- *Publisher*: name of the supplier of the document;
- *URL*: Uniform Resource Locator (URL). This provides the name of the host, port, path and filename needed to retrieve the document;

- *Abstract*: summary of the content of the document;
- *Key words*: descriptive terms that summarise the content of the document. They would have to be assigned in the different official languages of the European Union.

5. Conclusions

We have verified that Internet implementation is not homogeneous in all countries and public administrations.

The public sector is beginning to use the advantages of the Net to broadcast its messages and to offer citizens useful information about the administration. Public administration has extensive resources of information that are very valuable for individual users as well as for the community. It can supply information to the business world as well as to the suppliers of information who give services of added value, and to society in general. However, access to this information tends be difficult and cumbersome in all the member states of the European Union. It is because of this that better access and use of the information resources of the public sector should be provided. We believe that the creation of the directory proposed in this paper will help the citizen.

We are of the opinion that public administration should increase the use of the new information systems such as the Internet since this will result in greater efficiency in the development of their functions and, therefore, in a better service to the public — a service that constitutes the goal of information systems for public service.

As we have previously said, what is necessary is the existence of a methodology — standards on the part of the European Union — to create a public administrations network on the Internet, and it would be necessary to create programmes for regional development because the situation at the moment is not homogeneous.

We know that the existence of standardisation permits the availability of rapid, reliable information, and the improvement of relations between the administration and the citizen and of the services that supply the administration. We are aware that a general plan of action must be developed that guarantees quality.

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